Avgustinovich, Sergey V.; **Heden, Olof**; **Solov'eva, Faina I.**
The classification of some perfect codes. (English) Zbl 1048.94018
Des. Codes Cryptography 31, No. 3, 313-318 (2004).

Summary: Perfect 1-error correcting codes C in $\mathbb{Z}_2^n$, where $n = 2^m - 1$, are considered. Let $\langle C \rangle$ denote the linear span of the words of C, and let the rank of C be the dimension of the vector space $\langle C \rangle$. It is shown that if the rank of C is $n - m + 2$ then C is equivalent to a code given by a construction of *K. Phelps* [SIAM J. Algebraic Discrete Methods 5, 224–228 (1984; Zbl 0546.94015)]. These codes are, in case of rank $n-m+2$, described by a Hamming code H and a set of MDS-codes D_h, $h \in H$, over an alphabet with four symbols. The case of rank $n - m + 1$ is much simpler: Any such code is a Vasil'ev code.

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